(12) UK Patent Application (19) GB (11) 2 245 018 (13) A

(43) Date of A publication 18.12.1991

(21) Application No 9112811.6

(22) Date of filing 14.06.1991

(30) Priority data
(31) 9001660 (32) 15.06.1990 (33) ES

(71) Applicant
Contitech-Elastorsa S A

(Incorporated in Spain)

Avenida De Quel 35, 26580 Arnedo, La Rioja, Spain

(72) Inventor
Victorino Vivaracho Elvira

(74) Agent and/or Address for Service
Carpmaels & Ransford
43 Bloomsbury Square, London, WC1A 2RA,
United Kingdom

(51) INT CL[5]
E06B 7/16

(52) UK CL (Edition K)
E1J JGN

(56) Documents cited
None

(58) Field of search
UK CL (Edition K) E1J
INT CL[5] B60J, B60R, E06B

(54) **Metal framework for weather-strip**

(57) The framework comprises a U-shaped body, with a number of identical flat and transverse ribs (1) that are uniformly spaced out, and are grouped in pairs by means of longitudinal ridges (2) located at two imaginary longitudinal axes A and B that are in turn located on the lateral walls of the U-shaped body, while the various pairs of ribs (1) are attached to each other by means of other longitudinal ridges (3) that are in turn located on a single longitudinal axis C, positioned on one of the lateral faces of the U-shaped body. The framework may be used in weather-strip sections for motor cars and the like.

The weather-strip section's longitudinal contraction and stretch is directly proportional to the distance between axes A and C.

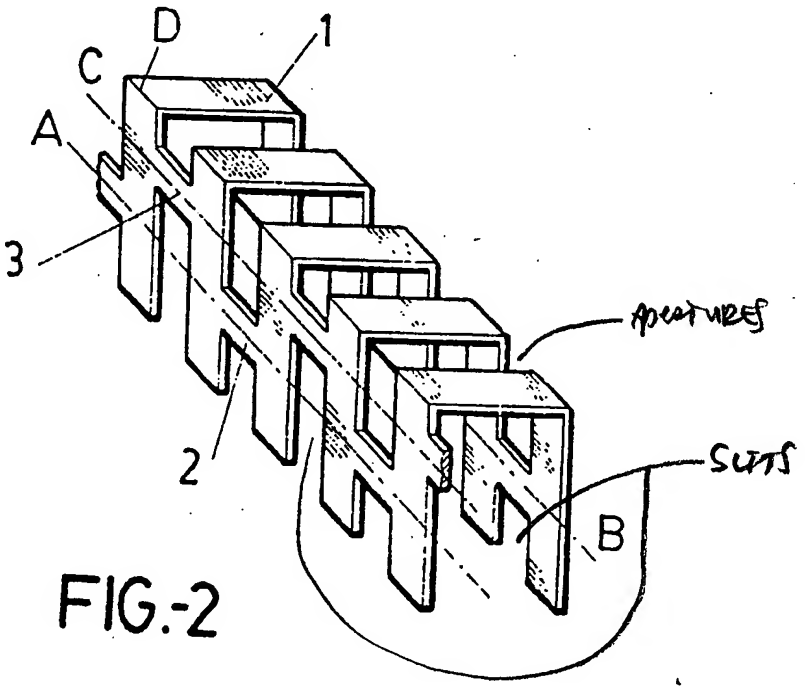

FIG.-2

GB 2 245 018 A

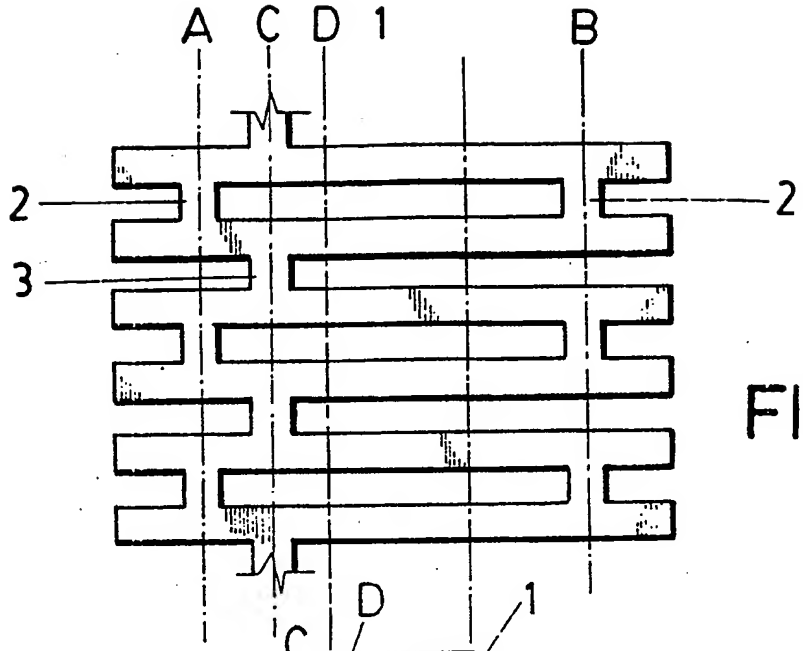

FIG.-1

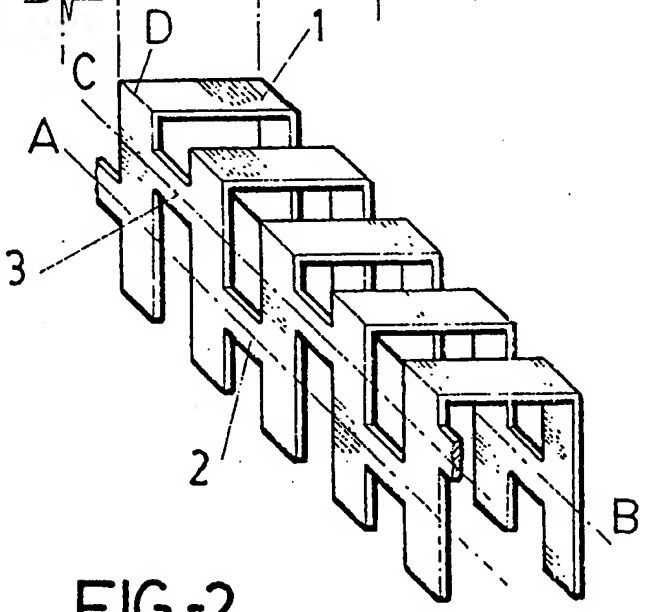

FIG.-2

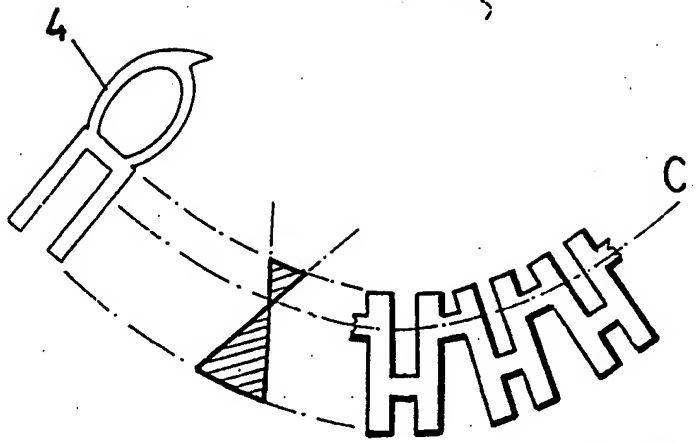

FIG.-3

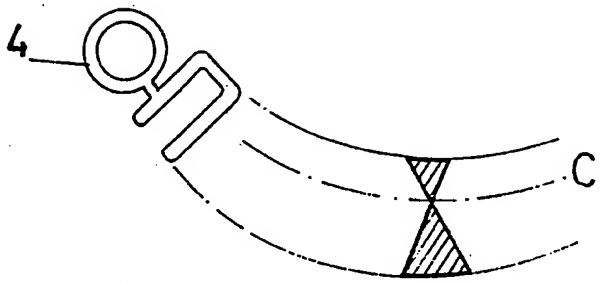

FIG.-4

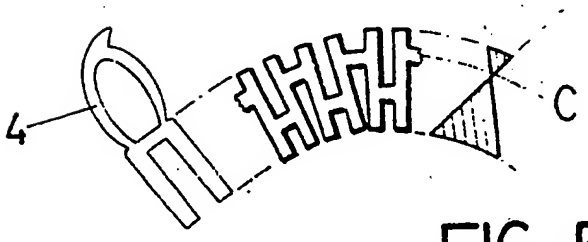

FIG.-5

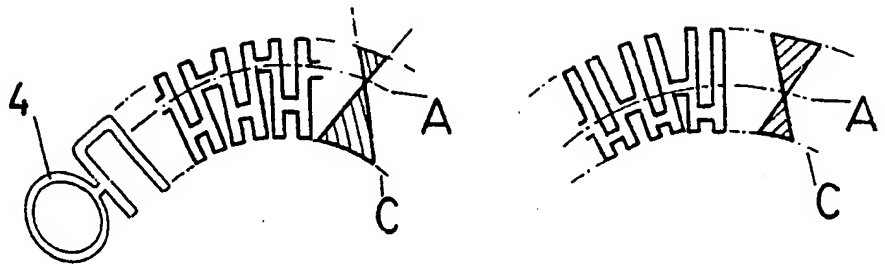

FIG.-6

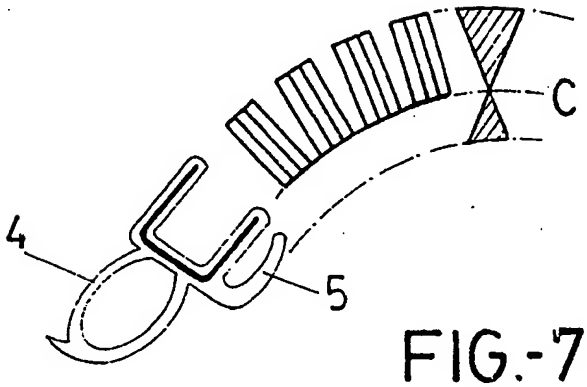

FIG.-7

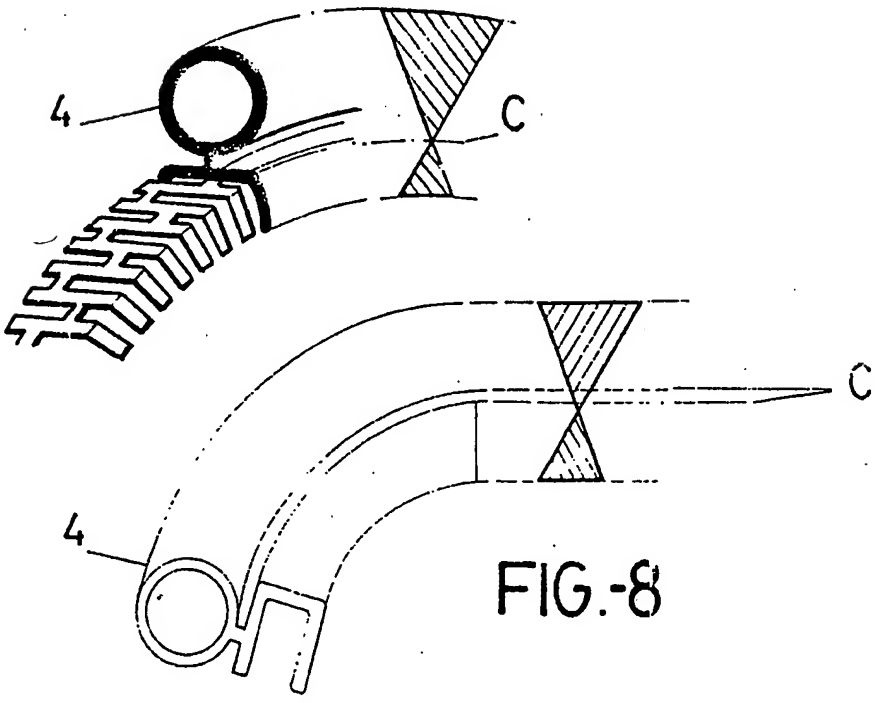

FIG.-8

METAL FRAMEWORK FOR WEATHER-STRIP SECTIONS USED IN MOTOR CARS AND THE LIKE

The present invention relates to a metal framework for weather-strip sections of the sort that are not normally used in motor car bodies, specifically on accesses to sealable openings, such as doors, boots, bonnets and the like, in order to render the relevant seal water-tight, which framework has been notably improved in order to achieve the best longitudinal contraction and stretch conditions, which variables can be adjusted, and likewise optimum control of residual stress upon bending the weather-strip section in different directions.

It is a known fact that this sort of sections comprise a U-shaped furrowed body made of an elastomer or plastic material, with a rubber weather strip attached to it, either to its middle branch or to one of its side branches. The furrowed body, designed to clamp or grip the perimetric rim of the opening where the section is to be fitted, is stiffened with a metal framework in order to enhance its positional stability on the vehicle, while the rubber weather strip actually provides a water-tight seal.

The metal framework must be structured so as to allow the section to be deformed in any direction, in order to adjust to the singular and variable geometry of each body to be sealed, whilst being stiff enough in its final position in order to be stable therein.

Furthermore, the metal framework must allow some longitudinal contraction of the section, in order to amend possible dimensional maladjustments between the actual section and the periphery of the opening to be sealed.

One of the widely used solutions in these metal frameworks comprises a "double comb" profile, having a longitudinal ridge and a number of transverse ribs pointing in either direction and being orthographically bent in order for the framework to be wholly furrowed and U-shaped as aforesaid. This solution, albeit acceptable so far as lateral deformations of the weather-strip section, affords no longitudinal contraction.

This is the same in other conventional solutions in which, to enhance lateral deformation of the section in a given direction, the framework, similar to the above, is fitted with two longitudinal ridges instead of only one, in this case to be located on the lateral faces of the groove defined by the framework, which solution has the same problems so far as contraction of the weather-strip section.

Metal frameworks are also known to be structured as a wire forming loops joined by longitudinal threads tied to the loops, which solution is problematic when dominating and pointing as appropriate the residual stress in the side bends, the wire element also tending to adopt a straight-line position, in turn tending at times to remove the section from its position.

The applicant hereof is the holder of utility model 281,093, likewise relating to a metal structure for sections in motor cars and the like, specifically, in this case, and with the same furrowed and U-shaped profile, the transverse ribs branching into Y-sections at each of their lateral branches, being at the same time connected to adjacent branches through the ends thereof, which are the only tie therebetween, such that, with two lateral

and longitudinal joining ridges, these latter's trajectory is rather uneven, thus allowing, in addition to lateral deformation of the section, slight contraction thereof.

However, such contraction can at times be insufficient and moreover does not allow the residual stress on the weather-strip section to be controlled, or adjustment thereof to very tight radii since one of its lateral faces cannot be stretched.

The metal framework for weather-strip sections subject hereof is a new and significant step forward in this technical field, allowing, in addition to optimum lateral deformation, longitudinal contraction that can also be adjusted, together with a perfect control over the residual stress when the section is bent in various directions, as aforesaid.

More specifically and in order to achieve the above, the metal framework subject hereof comprises, as is the norm, a laminated body having a number of uniformly spaced transverse ribs connected by means of longitudinal ridges, such laminated body being suitably formed to adopt a furrowed and U-shaped structure, but singularly characterised in that the said ribs are grouped in pairs by means of short longitudinal ridges located on imaginary axes that are in turn located on the lateral branches of the furrowed body, while these pairs of ribs are connected to each other by means of another group of ridges forming a single longitudinal row on an imaginary axis located on one of the lateral faces of the furrowed body, so that the pairs of ribs are wholly independent among each other, both through the other lateral branch of the furrowed body and through the middle branch thereof.

Furthermore, this being another characteristic of the invention, the imaginary axis upon which the ribs connecting the various pairs of transverse ribs are located, is out of step in respect of the axis of the same face of the furrowed body connecting the ribs within each pair, the degree of lateral contraction of the section being higher the more spaced out these two axes are.

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a set of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, shows the following:

Figure 1.- Is the metal framework for weather-strip sections used in motor cars and the like subject of this invention.

Figure 2.- Is the same metal framework, showing its furrowed structure and viewed in perspective.

Figures 3, 4, 5, 6, 7 and 8.- Are different performance diagrams of the metal framework, according to the type of weather-strip section and the deformations that it must stand.

In the light of these figures, and more specifically figures 1 and 2, it can be seen that the metal framework subject hereof is a laminated and flat structure, shown in figure 1, that is turned into a furrowed and U-shaped structure, aimed to be coated with rubber or flexible plastic.

More specifically, the said flat structure is provided with a number of transverse ribs (1), identical to each other, parallel and equidistant, grouped in pairs by means of longitudinal ridges or ties (2) and (2') located rather close to the ends thereof and that are in turn included in imaginary longitudinal axes A and B, that after transforming this flat structure into the furrowed structure of figure 2, are located on the lateral faces of the U-shape, as is also shown in this figure.

These pairs of transverse ribs (1) are also connected to each other by means of other ties or longitudinal ridges (3), that are in this case aligned on an imaginary single axis, namely C, located on one of the lateral faces of the furrowed body, specifically between axis A of the aforesaid ridges (2) and the folding line D connecting this lateral wall in the furrowed body to its middle branch.

According to this structure, longitudinal contraction, as required by the section for assembly thereof, can be graduated depending, besides the thickness and nature of the metal band, and the width of ribs (2), (2') and (3) and sections (1), on the distance between axes A and C, so that the larger this distance, the higher the possibility of shortening the weather-strip section as a whole.

Referring to the face of the framework where axis C is located as the neutral face, since when the weather-strip section must be deformed laterally there are neither tractive nor compressive stresses on such face, it could in practice happen that the turning radii, when deforming the section, be parallel to the said neutral face, which deformations are perfectly acceptable to the framework, a neutral line appearing on axis C, which, being close to the middle framework branch, minimises compressive stresses if the weather strip or tubular element (4) is attached to such face and takes up a curvature as shown in figure 3.

In the case of weather strips or tubular elements (4) attached to the middle branch, bending in the opposite direction, the effect is the opposite, for they are under tractive stress, but as the neutral line is close to such middle branch, tractive stresses are minimised and the tendency to flatten the weather strip (4) is less, as shown in figure 5.

In the case of weather strips (4) attached to the neutral face, the harmful compressive stress could be lessened, if there were many radii of this sort, moving axes A and C towards the end of the framework, as shown in figure 6, or holding the same as close as possible to the middle branch if the radii are of the opposite sort, as shown in figure 4.

The metal framework's performance is excellent when the turning radii are at a right angle to the neutral face.

Mainly for sections having the weather strip or tubular element (4) attached to the middle branch, when bending the section in this manner, the whole section remaining outside the neutral face is under tractive stress, to avoid the appearance of creases. When part of the section remains inside the neutral face, as the sector numbered (5) in figure 7, compressive stresses appear that, being proportional to the distance to the said neutral face, are smaller than the other type of framework.

In sections with a weather strip (4) attached to the neutral face, the whole weather strip remains outside the same and is hence under tractive stresses that will lead the weather strip to be flattened. In the framework of the invention, the neutral face is very close to the actual weather strip, and the tractive stresses are therefore smaller than in other cases, and thus flattening will also be smaller, as shown in figure 8.

We feel that the device has now been sufficiently described for any expert in the art to have grasped the full scope of the invention and the advantages it offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

It will of course be understood that the present invention has been described above purely by way of example, and that modifications in detail can be made within the scope of the invention.

CLAIMS

1.- Metal framework for weather-strip sections used in motor cars and the like, being of the sort comprising a flat structure having a number of equal and uniformly spaced transverse ribs, which flat structure has two longitudinal folding lines to make up a U-shaped furrowed body, essentially characterised in that the said ribs are grouped in pairs by means of ridges forming two longitudinal rows located rather close to the ends of such ribs and specifically located on the lateral faces of the furrowed body, such pairs of ribs being moreover connected to each other by means of other ridges that form a single longitudinal row and that are in turn located on one of the lateral branches of the furrowed body, such that said pairs of ribs are wholly independent to each other at the other lateral branch and at the middle branch of such furrowed body.

2.- Metal framework for weather-strip sections used in motor cars and the like, as in claim 1, characterised in that the imaginary longitudinal axis grouping the ridges joining the pairs of ribs is located between the imaginary axis grouping the ribs in each pair on the same lateral branch of the furrowed body and the ridge joining the said lateral branch to the middle branch thereof.

3.- Metal framework for weather-strip sections used in motor cars and the like, as in preceding claims, characterised in that the space between the axis grouping the longitudinal ridges joining pairs of ribs and the axis grouping the ridges joining the ribs in each pair, located on the same face, is variable and directly proportional to the degree of contraction provided for the weather-strip section as a whole.

4.- Metal framework substantially as hereinbefore described with reference to and as shown in Figure 1 or Figure 2 of the accompanying drawings.

5.- A weather-strip section incorporating a metal framework as claimed in any preceding claim.

Published 1991 at The Patent O[illegible]. Further copies may be obtained from Multiplex techniques ltd. St Mary Cray. Kent.